

### **Gloworm: Development and provision of farm management data for use in constructing models of the impacts of global climate change on helminth infections in ruminants (RMIS 6172)**

The epidemiology of parasites of veterinary importance is driven not only by climate but also by farm management. Data on how grazing ruminants are managed in different regions of Europe are therefore essential to the performance of predictive transmission models and their relevance for parasite control. Many guidelines exist for anthelmintic treatment of ruminant livestock managed within grazing systems. However, the life-cycle of the nematodes is significantly influenced by the prevailing climate. Consequently, climate change will likely alter the nematode infection challenges faced when managing cattle and sheep. These challenges may be direct (i.e. the biology of the nematodes life cycle changes in direct response to climate change) or indirect (i.e. other aspects of the grassland and animal management are changed in response to climate change, and these impact indirectly on the nematode challenge). Hence, the Teagasc Grange task in the overall FP7 project is to quantify the critical defining characteristics of ruminant production systems in Europe (with an emphasis on criteria relevant to nematode infection), and predict how both these characteristics and the associated ruminant production systems will alter in response to climate change. This information will then allow the other consortium partners better define appropriate monitoring and remedying strategies for the expected nematode challenges.

The aims of the Teagasc Grange task are to

1. Establish a database characterising typical farm management for selected ruminant production systems and geographical regions of Europe, and characterise within-region variation, with an emphasis on measurable variables relevant to parasite transmission (e.g. grazing management). Thus, the main production systems for beef cattle, dairy cows and sheep at a range of representative locations in Europe are being defined in terms of critical, measurable characteristics that uniquely define the systems, but with an emphasis on (a) factors that influence nematode infections and (b) estimating the variance around these factors within each enterprise and region.
2. Provide a qualitative assessment of likely global change-driven alterations to farm management within these regions in Europe. Thus, there is an emphasis on defining how climate change will impact on (a) grass growth: annual yield, seasonal distribution, quality, efficiency of utilisation, (b) grazing animal management: feed intake, behaviour, productivity, and (c) farm management responses to the changes in feed supply, animal needs, market conditions, etc.

Stages in undertaking this task include:

1. Review literature, systems models and expert opinion to identify the critical, measurable characteristics that uniquely define the beef, dairy and sheep systems currently operated in various European locations.
2. Access and collate required data from various national and European census, statistical, meteorological and other databases, and derive the required technical descriptors of grassland, livestock systems, climate, etc.
3. Undertake additional surveys within livestock enterprises and regions to provide required data that are not otherwise accessible.
4. Use climate models to define how climate change will impact on grass growth (annual yield, seasonal distribution, nutritive quality).
5. Use expert opinion (and some published literature) to indicate how livestock systems will respond to the changed profiles of grass growth.
6. Publish the output in peer-review journals.

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